TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT NO. 46673
Nord Resources Corporation

I. INTRODUCTION

This Class II, synthetic minor air quality control operating permit is for the construction and operation of the Johnson Camp copper mine near Dragoon in Cochise County, Arizona. The facility is owned and operated by Nord Resources Corporation. The facility has an anticipated lifetime production of 123 million tons of ore and waste rock and an anticipated operating life of 16 years.

A. Company Information

Facility Name:	Johnson Camp Mine
Facility Location:	55 miles east of Tucson Approximately 2 miles north of I-10 via Exit 322
Mailing Address:	1 West Wetmore, Suite 203 Tucson, Arizona 85705

B. Attainment Classification

The Dragoon area is attainment for all criteria pollutants.

C. Learning Sites Evaluation

There are no learning sites within two miles of the facility.

II. PROCESS DESCRIPTION

A. Open-Pit Mining

The mine consists of two pits, the Burro and the Copper Chief. Drilling and blasting will occur in both mines. Ore requiring crushing will be transported by haul truck to the primary crusher. Run of Mine (ROM) ore suitable for immediate heap leaching will be delivered directly to the leach pad. Waste rock will be transported by haul truck to the waste stockpile.

B. Crushing and Screening Circuit

Haul trucks will deliver ore to the primary crusher. The ore will be crushed and conveyed to the coarse ore stockpile. Belt feeders located under the coarse ore stockpile will convey ore to the secondary screens. Undersize ore will be conveyed to the fine ore stockpile while oversize ore will be conveyed to the secondary crushers. Discharge from the secondary crushers will be conveyed to the fine ore stockpile.

C. Agglomeration Process

Three vibrating feeders located under the fine ore stockpile will convey ore to the agglomerator. Dilute sulfuric acid will be added to enhance the agglomeration and begin the leaching process. The ore is then conveyed to the leach pad.

D. Heap Leaching

Dilute sulfuric acid (leach solution) will be applied via drip emitters and/or low angle wobblers to the surface of the leach pad. The leach solution will extract copper from the ore as it drains through the leach pad. The resulting pregnant leach solution (PLS) will flow downhill into a double-lined PLS collection pond. The PLS is then piped to the solution extraction/electrowinning (SX/EW) plant.

E. SX/EW plant

At the SX/EW plant the PLS is pumped to a extraction mixer/settler tank where it is mixed with an organic solution similar to kerosene. When the organic solution mixes with the PLS, the copper is transferred to the organic solution. The mixture is allowed to settle and the copper laden organic solution floats to the top of the tank. The organic solution is pumped from the top of the extraction mixer/settler tank to a stripping mixer/settler tank. The organic solution is mixed with a strong sulfuric acid mixture (electrolyte) and the copper is transferred to the electrolyte. After being allowed to separate, the copper laden electrolyte is pumped to the electrowinning tankhouse. The tankhouse is comprised of many individual cells which each contain many blank stainless steel cathodes. When electricity is applied to the cathodes, pure copper begins to plate onto the stainless steel. After several days the cathodes are removed and a large plate of copper is pried from the stainless steel.

III. EMISSIONS

Emissions from this facility are the result of ore and waste rock processing (crushing, screening, conveying), the propane electrolyte heater and the SX/EW process. The Permittee is installing dust collectors and water sprays to lower particulate matter emissions. The Permittee is also limiting the daily miles traveled by haul trucks and ore blasting in order to not exceed the National Ambient Air Quality Standard (NAAQS) for PM_{10}. Table 1 below provides the facility's Potential to Emit (PTE). Information on fugitive emissions can be found in the application.

Table 1: PTE of Facility (for non-fugitive emissions)

Pollutant	Facility Potential to Emit (tons/year)
PM_{10}	24.7
PM	24.7
NO_x	1.68
CO	.23
SO_2	.178
VOC	9.50
H_2SO_4 Mist	2.47

IV. APPLICABLE REGULATIONS

The applicable regulations were identified by the company as part of the application packet. If necessary, the source is required to list any additional regulations that may be applicable. Table 2 displays the applicable requirements for each piece of equipment under this proposed permit.

Table 2: Verification of Applicable Regulations

Unit	Control Device	Rule	Verification
Metallic Mineral Processing from Primary Crusher to Leach pad; excluding material handling from the primary crusher and the coarse ore stockpile, the lengths of all conveyor belts between the transfer points, the conveyor to fine ore stockpile drop point, the agglomerate, and the final conveyor drop point at the leach pad.	Baghouses; Water sprays; Material moisture after the agglomerator	40 CFR 60.382(a) 40 CFR 60.382(a)(2) 40 CFR 60.382(b) 40 CFR 60.386(a) 40 CFR 60.386(b)(1) 40 CFR 60.386(b)(2)	The crushers, screens, conveyor belt transfer points, storage bins and truck unloading stations are affected facilities located in a metallic mineral processing plant as defined in NSPS Subpart LL
Metallic Mineral Processing from the primary crusher and the coarse ore stockpile, the lengths of all conveyor belts between the transfer points, the conveyor to fine ore stockpile drop point, the agglomerator, and the final conveyor drop point at the leach pad.	Baghouses; Water sprays; Material moisture after the agglomerator	A.A.C. R18-2-702.B.3 A.A.C. R18-2-702.C A.A.C. R18-2-721.B.1 A.A.C. R18-2-721.B.2 A.A.C. R18-2-721.D	The PM limits from A.A.C. R18-2-721 apply to material handling conducted at an existing nonferrous metals industry source. The opacity standards from A.A.C R18-2-702 apply to existing stationary point sources.
Electrolyte Heaters	N/A	A.A.C. R18-2-724.C.1 A.A.C. R18-2-724.J	These standards apply to fossil fuel fired industrial equipment rated at between .5 MMBTU/hr and 250 MMBTU/hr in which the products of combustion do not come into direct contact with process materials.
Solution Extraction / Electrowinning Process	Covers on tanks; Dispersion balls or equivalent method to control acid emissions	A.A.C. R18-2-730.D A.A.C. R18-2-730.F A.A.C. R18-2-730.G	These standards apply to unclassified sources.
Fugitive dust sources	Water and other reasonable precautions.	A.A.C. R18-2-602 A.A.C. R18-2-604.A,B A.A.C. R18-2-605.A,B A.A.C. R18-2-606 A.A.C. R18-2-607.A,B A.A.C. R18-2-614 A.A.C. R18-2-702.B	These standards are applicable to all fugitive dust sources at the facility.

Unit	Control Device	Rule	Verification
Mobile sources	Water Sprays/Water Truck for dust control	A.A.C. R18-2-801.A,B A.A.C. R18-2-802.A,B A.A.C. R18-2-804.A,B	These are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2-702.B A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702.B A.A.C. R-18-2-727.A A.A.C. R-18-2-727.B A.A.C. R-18-2-727.C A.A.C. R-18-2-727.D SIP Provision R9-3-527.C	This standard is applicable to any spray painting operation.
Demolition/renovation operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Gasoline Storage and Dispensing	Submerged filling device; Pump/compressor seals	A.A.C. R18-2-710.B A.A.C. R18-2-710.D A.A.C. R18-2-710.E.1	These standards apply to existing storage vessels for petroleum liquids.

V. MONITORING AND RECORDKEEPING REQUIREMENTS

A. Facility Wide

1. Along with the semiannual compliance certification, the Permittee is required to submit reports of all recordkeeping, monitoring and maintenance required by the permit.

2. The Permittee is required to maintain, on-site, records of the manufacturer's specifications or an Operation and Maintenance Plan for all equipment listed in the permit

3. The Permittee is required to show compliance with the condition to limit haul truck usage on unpaved roadways to 1,824 miles per day by recording the odometer reading of each haul truck at the beginning and end of each day. At the end of each day, the Permittee is required to calculate and record the cumulative miles traveled by all haul trucks at the end of each day.

4. The Permittee is required to show compliance with the condition to limit blasting to once per day by keeping records of all blasting.

5. The Permittee is required to maintain and adhere to a dust control plan that ensures 75% control of dust.

B. Metallic Mineral Processing Subject To NSPS Subpart LL

1. The Permittee is required to show compliance with the opacity standards in Attachment "B', Section III by having a Method 9 certified observer perform bi-weekly surveys of visible emission from the baghouses and process fugitive emission points. The observer is required to conduct a 6-minute Method 9 observation if the results of the initial survey appear on an instantaneous basis to exceed the applicable standard or baseline opacity level.

2. The Permittee is required to keep records of the name of the observer, the time, date, and location of the observation and the results of all surveys and observations.

3. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

C. Metallic Mineral Processing Subject To A.A.C. R18-2-721

1. The Permittee is required to show compliance with the opacity standards in Attachment "B", Section IV by having a Method 9 certified observer perform bi-weekly surveys of visible emissions. The observer is required to conduct a 6-minute Method 9 observation if the results of the initial survey appear on an instantaneous basis to exceed the applicable standard.

2. The Permittee is required to keep records of the name of the observer, the time, date, and location of the observation and the results of all surveys and observations.

3. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

4. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

5. The Permittee is required to show compliance with the sulfur dioxide emission limitation in Attachment "B", Section VI by keeping a daily record of the sulfur content and lower heating value of the fuel being fired in the generator.

D. Electrolyte Heaters

1. The Permittee is required to show compliance with the opacity standards in Attachment "B', Section VII by having a Method 9 certified observer perform a monthly survey of visible emissions from the stack of the electrolyte heater. The observer is required to conduct a 6-minute Method 9 observation if the results of the initial survey appear on an instantaneous basis to exceed the applicable standard.

2. The Permittee is required to keep records of the name of the observer, the time, date, and location of the observation and the results of all surveys and observations.

3. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

E. Solution Extraction / Electrowinning (SX/EW) Process

The Permittee is required to maintain a record of all control measures used to limit emissions

from the SX/EW process.

F. Fugitive Dust

1. The Permittee is required to keep record of the dates on which any of the dust control measures contained in Attachment "B", Conditions IX.B.1.a.(3)(a) through IX.B.1.a.(3)(h) are employed.

2. The Permittee is required to show compliance with the opacity standards in Attachment "B', Section IX by having a Method 9 certified observer perform a monthly survey of visible emission from fugitive dust sources. The observer is required to conduct a 6-minute Method 9 observation if the results of the initial survey appear on an instantaneous basis to exceed the applicable standard.

3. The Permittee is required to keep records of the name of the observer, the time, date, and location of the observation and the results of all surveys and observations.

4. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

5. The Permittee is required to keep records on any open burning permits approved for the facility.

G. Mobile Sources

The Permittee is required to keep records of all emission related maintenance performed on the mobile sources.

H. Periodic Activities

1. The Permittee is required to record the date, duration and pollution control measures of any abrasive blasting project.

2. The Permittee is required to record the date, duration, and quantity of paint used, any applicable MSDS, and pollution control measures of any spray painting project.

3. The Permittee is required to maintain records of all asbestos related demolition or renovation projects. The required records include the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.

I. Gasoline Storage and Dispensing

The Permittee is required to maintain a storage tank log showing the information from the Product Transfer Documents, the tank identification and the dates on which the tank is empty.

VI. Testing Requirements

A. The Permittee is required to perform an annual Method 5 or 17 performance test for PM on the baghouses.

B. The Permittee is required to conduct an annual Method 9 test for opacity on the baghouses.

C. The Permittee is required to conduct an annual Method 9 test for opacity on the process fugitive

emission points covered under Attachment "B", Section III.

D. The Permittee is required to conduct an annual Method 9 test for opacity on the emission points covered under Attachment "B", Section IV.

VII. Insignificant Activities

Table 3, below, lists insignificant activities conducted by the Permittee.

Table 3: Insignificant Activities

Equipment Description	Maximum Size or Capacity	Verification of Insignificance
Plant Sulfuric Acid Tank	20,000 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.
Leach Sulfuric Acid Tank	100,000 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.
Strong Electrolyte Storage Tank	8,000 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.
Tank House Feed Storage Tank	16,000 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.
Diesel Storage Tank	12,000 gallons	A.A.C. R18-2-101.57.c Diesel tank smaller than 40,000 gallons
Diluent Tank	13,000 gallons	A.A.C. R18-2-101.57.c Tank smaller than 40,000 gallons and contents less volatile than diesel
Loaded Organic Tank	33,000 gallons	A.A.C. R18-2-101.57.c Tank smaller than 40,000 gallons and contents less volatile than diesel
Sample Preparation Equipment (test crusher, drying oven, pulverizer)	50 samples per day	A.A.C. R18-2-101.57.j Emissions will be insignificant.
Assay Lab	50 samples per day	A.A.C. R18-2-101.57.i Lab equipment used exclusively for chemical and physical analyses.
Round Storage Tank on Legs in Organic Recovery Area	5,800 gallons	A.A.C. R18-2-101.57.c Tank smaller than 40,000 gallons and contents less volatile than diesel
Square Storage Tank on Legs in Organic Recovery Area	2,500 gallons	A.A.C. R18-2-101.57.c Tank smaller than 40,000 gallons and contents less volatile than diesel
Electrolyte Filter Tank 1	2,650 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.
Electrolyte Filter Tank 2	2,650 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.

Equipment Description	Maximum Size or Capacity	Verification of Insignificance
Green Wash Tank	N/A	A.A.C. R18-2-101.57.j Tank used to store water.
Barren Electrolyte Storage Tank	16,000 gallons	A.A.C. R18-2-101.57.j Tank contents are not volatile and emissions will be insignificant.

VII. Ambient Air Impact Analysis

Nord Resources Corporation conducted an Ambient Air Impact Analysis to demonstrate protection of the National Ambient Air Quality Standards (NAAQS). The highest predicted impact for criteria pollutants is from PM_{10}, with a predicted concentration that is 83% of the NAAQS 24-hour limit. The predicted maximum concentrations of all criteria pollutants from the facility are not expected to exceed the NAAQS. Table 4 lists the results of the analysis.

Table 4 – Results of Ambient Air Impact Analysis

Pollutant (Averaging Time)	NAAQS ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$)	Percentage of NAAQS
PM_{10} (24-hour)	150	124	83%
PM_{10} (annual)	50	22.7	45%
SO_2 (3-hour)	1,300	47	4%
SO_2 (24-hour)	365	18.4	5%
SO_2 (annual)	80	3.2	4%
NO_x (annual)	100	5.4	5%
CO (1-hour)	40,000	845.1	2%
CO (8-hour)	10,000	671.3	7%

IX. LIST OF ABBREVIATIONS

SX/EW:	Solution Extraction and Electrowinning
PLS:	Pregnant Leach Solution
NAAQS:	National Ambient Air Quality Standards
AAC:	Arizona Administrative Code
MSDS:	Material Safety Data Sheets
NSPS:	New Source Performance Standards
NESHAPS:	New Source Performance Standards
PTE:	Potential to Emit
VOC:	Volatile Organic Compounds